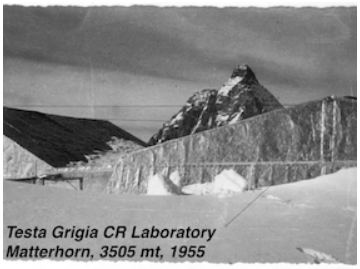

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High-energy electron bursts in the inner Earth's magnetosphere caused by precipitation from radiation belt

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Orbital experiment ARINA on the board of Russian satellite Resurs-DK1 launched in 2006 developed to study charged particle flux (electrons E ~ 3-30 MeV, protons E ~ 30-100 MeV) in near-Earth space, especially high-energy electron precipitation from the inner radiation belt caused by various geophysical and solar-magnetospheric phenomena. Precipitated electrons under certain conditions (energy, LB-coordinate) drifts around the Earth and can be detected as fast increase in count rate of satellite spectrometer (so called bursts). High-energy electron bursts can be caused by local geophysical phenomena (like earthquakes or thunderstorms). Such bursts have distinct features in their measured energy-time distribution. These features contains information about initial location of electron precipitation. In previous works, particle precipitation region searching method is described, the main idea of the method is to use numerical model of electron movement in magnetosphere to find longitudinal distance between region of precipitation and burst registration location on the board of satellite, and with knowledge of L-coordinate define precipitation region borders. Major problem of this type of analysis is the high number of background electrons (atmospheric albedo). Several methods (linear, robust regression, etc.) were used previously to minimize number of background particles involved in analysis. In this report, the new ensemble method was developed, it uses the combining results from several methods in dependence of burst registration conditions. Ensemble method was tested on simulation and experimental data. Numerical simulation of local particles precipitations based on well-known equations of relativistic particle movement in Earth magnetosphere. In experimental data analysis, the results from ARINA experiment for 10 years was used. Several results based on burst experimental data are shown. Ensemble method shows better results than any single method alone.

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